

21.

Nesting of the Sunfish, *Lepomis auritus* (Linnaeus), in
Tidal Waters.

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(Plate I).

During the summer of 1939, while the writer was making herpetological investigations in New Kent County, near Lanexa, Virginia, large numbers of sunfish nests were observed exposed at low tide along the shore of the Chickahominy River. These were all nests of *Lepomis auritus* (Linnaeus). On July 13, 1939, there being a low tide in the afternoon, the nests were photographed (Plate I) and examined more closely. At this time they contained eggs, in different stages of development, and hatchlings. Several nests were being constructed, and several were no longer in use, as could be seen by the accumulated silt. During low tide adult sunfish were not seen, although when the nests were submerged they could be seen swimming about in them.

The sites chosen for nesting were located where the bottom was of sand, not too deeply covered by mud and usually near some sheltering object such as a log (Pl. I, Fig. 1), stump, or as shown in Pl. I, Fig. 2, along the base of a retaining wall. In suitable locations the nests were grouped in large numbers, in some cases so closely that only the width of the rim separated them. This crowding was probably due to the areas suitable for nesting being very limited in this locality. The river is always turbid and all of the shallow water sheltered from wave and tide action has a mud bottom because of the rapid rate of silting, and is thus rendered unsuitable for nesting. Since all of the river has a mud bottom below the level of the normal low tide, there is left as the only possible nesting area a narrow strip of sand between the levels of the high and low tides on the more exposed portions of the shore. The proximity of the nests to the shore is apparently limited by the level of the lowest high tide; presumably the length of exposure above that level discouraged nest-building.

The normal rise and fall of the tides here is approximately two to three feet, but varies from day to day with a range of six feet between the extreme high tide and the extreme low. As the nests are all below the level of the lowest high tide, they are always submerged at least twice a day and on days when the tide is running high they may not be exposed at all. At other times only those nests nearest the shore are exposed. Thus the amount of the time that the nests are not submerged is extremely variable, the maximum exposure observed being about four hours with each low tide. This results in the nests being subjected to continually and rapidly changing environmental factors. When the low tide occurs during the afternoon, the nest is exposed to the direct rays of the sun and the shallow water remaining in it becomes warmer than that of the river, only to be abruptly cooled when the river returns. Equally variable is the depth of water over the nests, varying

from the four or five inches left in the nests at low tide to a maximum of five feet at extreme high tide. Slightly variable also is the salinity of the river, which, although normally fresh, becomes perceptibly brackish during any prolonged dry weather.

The dates on which nesting began and ended were not determined as the nests were present when these observations began, June 11, and were still there on August 4. However, on returning to this locality September 7, only the outlines of a few of the nests remained. A week later even they had disappeared, so it is probable that nesting ceased during the latter part of August. That these nests were successful under such conditions would seem to be implied by the presence of young fish in several of the nests.

EXPLANATION OF THE PLATE.

PLATE I.

- Fig. 1. Nests of *Lepomis auritus* in the Chickahominy River, Virginia, exposed at low tide.
- Fig. 2. Nests of *Lepomis auritus* in the Chickahominy River, Virginia, along a retaining wall, exposed at low tide.